IN THE CLAIMS:

Claim 1 (original)A Si/C superlattice useful for semiconductor devices, comprising a plurality of epitaxially grown silicon layers alternating with carbon layers respectively adsorbed on surfaces of said silicon layers.

Claim 2 (original) A Si/C superlattice according to claim 1, wherein said superlattice forms a structure in which each epitaxial silicon layer has been epitaxially grown on a surface of an underlying silicon layer, said surface of said underlying silicon layer having a carbon layer adsorbed thereon.

Claim 3 (original) The Si/C superlattice according to claim 1, comprising from 2 to about 16 epitaxial silicon layers.

Claim 4 (original) The Si/C superlattice according to claim 3, comprising 3 to 9 epitaxial silicon layers.

Claim 5 (original) The Si/C superlattice according to claim 1, wherein the carbon layer adsorbed on the silicon layer surface is a carbon monolayer.

Claim 6 (original) The Si/C superlattice according to claim 2, wherein the carbon layer adsorbed on the silicon layer surface is a carbon monolayer.

Claim 7 (original) The Si/C superlattice according to claim 1, wherein each epitaxial silicon layer is an ultrathin layer.

Claim 8 (original) The Si/C superlattice according to claim 7, wherein each epitaxial silicon layer is less than about 4 nm in thickness.

Claim 9 (original) The Si/C superlattice according to claim 7, wherein each epitaxial silicon layer is less than about 2 nm in thickness.

Claim 10 (original) The Si/C superlattice according to claim 1, further comprising a low defect density silicon substrate over which said alternating layers of silicon and carbon were grown.

Claim 11 (original) The Si/C superlattice according to claim 10, wherein a surface of said substrate has an adsorbed layer of carbon over which a layer of silicon of said superlattice was epitaxially grown.

Claim 12 (original) A structure useful for electronic or opto-electronic devices, said structure comprising a Si/C superlattice comprising a plurality of epitaxially grown silicon layers alternating with carbon layers respectively adsorbed on surfaces of said silicon layers, said superlattice having an upper end in the direction of epitaxial silicon layer growth and a lower end in the opposite direction; a top layer comprising epitaxial silicon disposed at said upper end; and a low defect density silicon substrate disposed at said lower end.

Claim 13 (original) The structure according to claim 12, wherein said superlattice forms a structure in which each epitaxial silicon layer has been epitaxially grown on a surface of an underlying silicon layer, said surface of said underlying silicon layer having a carbon layer adsorbed thereon.

Claim 14 (original) The structure according to claim 12, wherein said superlattice comprises from 2 to about 16 epitaxial silicon layers.

Claim 15 (original) The structure according to claim 12, wherein said superlattice comprises 3 to 9 epitaxial silicon layers.

Claim 16 (original) The structure according to claim 12, wherein in said superlattice the carbon layer adsorbed on the silicon layer surface is a carbon monolayer.

Claim 17 (original) The structure according to claim 12, wherein in said superlattice each epitaxial silicon layer is less than about 4 nm in thickness.

Claim 18 (original) The structure according to claim 12, wherein in said superlattice each epitaxial silicon layer is less than about 2 nm in thickness.

Claim 19 (original) The structure according to claim 12, wherein said silicon substrate comprises a silicon buffer layer disposed in contact with the lower end of said superlattice.

Claim 20 (original) The structure according to claim 19, wherein said buffer layer has a thickness of from about 200 nm to about 300 nm.

Claim 21 (original) The structure according to claim 12, wherein said epitaxial silicon top layer has a thickness from about 15 nm to about 75 nm.

Claim 22 (original) The structure according to claim 12, wherein a layer of silicon oxide is disposed between said superlattice and said substrate.

Claim 23 (original) A structure useful for electronic or opto-electronic devices, said structure comprising a Si/C superlattice comprising a plurality of epitaxially grown silicon layers alternating with carbon layers respectively adsorbed on surfaces of said silicon layers, said superlattice having an upper end in the direction of epitaxial silicon layer growth and a lower end in the opposite direction; a top layer comprising epitaxial silicon carbide disposed at said upper end; and a low defect density silicon substrate disposed at said lower end.

Claim 24 (original) The structure according to claim 23, wherein said superlattice forms a structure in which each epitaxial silicon layer has been epitaxially grown on a surface of an underlying silicon layer, said surface of said underlying silicon layer having a carbon layer adsorbed thereon.

Claim 25 (original) The structure according to claim 23, wherein said superlattice comprises

from 2 to about 16 epitaxial silicon layers.

Claim 26 (original) The structure according to claim 23, wherein said superlattice comprises 3 to 9 epitaxial silicon layers.

Claim 27 (original) The structure according to claim 23, wherein in said superlattice the carbon layer adsorbed on the silicon layer surface is a carbon monolayer.

Claim 28 (original) The structure according to claim 23, wherein in said superlattice each epitaxial silicon layer is less than about 4 nm in thickness.

Claim 29 (original) The structure according to claim 23, wherein in said superlattice each epitaxial silicon layer is less than about 2 nm in thickness.

Claim 30 (original) The structure according to claim 23, wherein said silicon substrate comprises a silicon buffer layer disposed in contact with the lower end of said superlattice.

Claim 31 (original) The structure according to claim 30, wherein said buffer layer has a thickness of from about 200 nm to about 300 nm.

Claim 32 (original) The structure according to claim 23, wherein a layer of silicon oxide is disposed between said superlattice and said substrate.

Claim 33 (original) The structure according to claim 23, wherein one or more epitaxial silicon layers of said superlattice were converted to silicon carbide.

Claim 34 (original) The structure according to claim 33, wherein a layer of silicon oxide is disposed between said superlattice and said substrate.

Claim 35 (original) A structure useful for electronic or opto-electronic devices, said structure comprising a Si/C superlattice comprising a plurality of epitaxially grown silicon layers alternating with carbon layers respectively adsorbed on surfaces of said silicon layers, said superlattice having an upper end in the direction of epitaxial silicon layer growth and a lower end in the opposite direction; a top layer comprising polycrystalline silicon carbide disposed at said upper end; and a low defect density silicon substrate disposed at said lower end.

Claim 36 (original) The structure according to claim 35, wherein said superlattice forms a structure in which each epitaxial silicon layer has been epitaxially grown on a surface of an underlying silicon layer, said surface of said underlying silicon layer having a carbon layer adsorbed thereon.

Claim 37 (original) The structure according to claim 35, wherein said superlattice comprises from 2 to about 16 epitaxial silicon layers.

Claim 38 (original) The structure according to claim 35, wherein said superlattice comprises 3

to 9 epitaxial silicon layers.

Claim 39 (original) The structure according to claim 35, wherein in said superlattice the carbon layer adsorbed on the silicon layer surface is a carbon monolayer.

Claim 40 (original) The structure according to claim 35, wherein in said superlattice each epitaxial silicon layer is less than about 4 nm in thickness.

Claim 41 (original) The structure according to claim 35, wherein in said superlattice each epitaxial silicon layer is less than about 2 nm in thickness.

Claim 42 (original) The structure according to claim 35, wherein a layer of silicon oxide is disposed between said superlattice and said substrate.

Claim 43 (original) The structure according to claim 35, wherein one or more epitaxial silicon layers of said superlattice were converted to silicon carbide.

Claim 44 (original) The structure according to claim 43, wherein a layer of silicon oxide is disposed between said superlattice and said substrate.

Claim 45 (currently amended) In a semiconductor device comprising an insulator or barrier material, the improvement wherein the insulator or barrier material comprises the Si/C superlattice of claim 1 ~~comprising replacement of said insulator or barrier material with a~~

~~superlattice comprising a plurality of epitaxially grown silicon layers alternating with carbon layers respectively adsorbed on surfaces of said silicon layers~~.

Claim 46 (currently amended) A system ~~for producing low defect density silicon carbide,~~ comprising: the Si/C superlattice of claim 1;

a template consisting of a superlattice comprising a plurality of epitaxially grown silicon layers alternating with carbon layers respectively adsorbed on surfaces of said silicon layers;

~~MBE~~ means for depositing epitaxial silicon carbide on said template; and

CVD means for depositing silicon carbide on said epitaxial silicon carbide.

Claim 47 (currently amended) ~~A~~ The Si/C superlattice of claim 1 produced by a method ~~for manufacturing low defect density silicon carbide for use in semiconductor devices,~~ comprising:

(a) providing a template consisting of a superlattice comprising a plurality of epitaxially grown silicon layers alternating with carbon layers respectively adsorbed on surfaces of said silicon layers;

(b) depositing epitaxial silicon carbide on said template by ~~MBE~~; and

(c) depositing silicon carbide on said deposited epitaxial silicon carbide by CVD.

Claim 48 (currently amended) The Si/C superlattice ~~method~~ according to claim 47, wherein said template provided in step (a) is produced by MBE wherein each epitaxial silicon layer has

been epitaxially grown on a surface of an underlying silicon layer, said surface of said underlying silicon layer having a carbon layer adsorbed thereon.

Claim 49 (currently amended) The Si/C superlattice ~~method~~ according to claim 47, wherein epitaxial silicon carbide is deposited in step (b) at a temperature from ~~about 700°C to~~ not exceeding about 1000°C.

Claim 50 (currently amended) The S/iC superlattice ~~method~~ according to claim 47, wherein the expitaxial silicon carbide is deposited in step (b) by MBE ~~(c) at temperature from about 1400°C to about 1800°C~~.

Claim 51 (original) A structure useful for electronic or opto-electronic devices, said structure comprising a Si/C superlattice comprising a plurality of epitaxially grown silicon layers alternating with carbon layers respectively adsorbed on surfaces of said silicon layers, said superlattice having an upper end in the direction of epitaxial silicon layer growth and a lower end in the opposite direction; and a top layer comprising silicon carbide deposited by CVD disposed at said upper end.

Claim 52 (original) The structure according to claim 51, wherein one or more epitaxial silicon layers of said superlattice were converted to silicon carbide.

Claim 53 (original) The structure according to claim 51, further comprising a low defect density

silicon substrate disposed at said lower end.

Claim 54 (original) The structure according to claim 52, further comprising a low defect density silicon substrate disposed at said lower end..

Claim 55 (new) A method for manufacturing low defect silicon carbide for use in semiconductor devices, comprising:

(a) providing a template consisting of a superlattice comprising a plurality of epitaxially grown silicon layers alternating with carbon layers respectively adsorbed on surfaces of said silicon layers;

(b) depositing epitaxial silicon carbide on said template; and

(c) depositing silicon carbide on said deposited epitaxial silicon carbide by CVD.